



AASHTOWare BrM 5.2.3

Multi-Criteria Decision Analysis
for Bridge Management

April 26, 2017

Mesa, Arizona

- [Contact](#)
- Multi-Criteria Decision Analysis
- Decision Alternatives in Bridge Management
- Bridge Management Criterion
- Utility
- Objectives
- Potential Utilization

BrM Help Desk

AASHTOWareBridge.com

BrM@Bentley.com

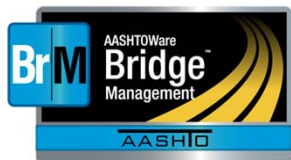
JIRA tickets:

bridgeware.atlassian.net

Josh Johnson, PE

TAM Lead Engineer

Joshua.Johnson@Bentley.com

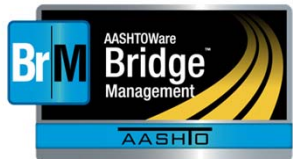


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Multi-Criteria Decision Analysis

Multi-criteria decision analysis methods aid decision makers in logically reasoning through the advantages and disadvantages of decision alternatives.

- Saaty & Vargas, 2001

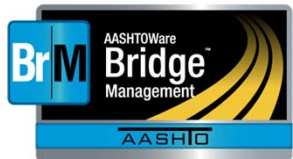


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Decision Alternatives in Bridge Management

Factors that Effect the 'Need for Work'

- Condition
- Functionality
- Risk
- Economics / Life Cycle Cost



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Bridge Management Criterion

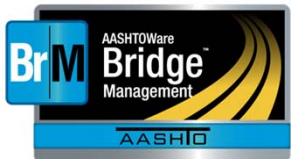
- Isolate items used to form a single rating or index
- Categorize them under distinct bridge management components
- Determine corresponding weighting factors

Structural Condition - measures the structural adequacy of a bridge

Mobility - evaluates how bridge attributes affect the traveling public

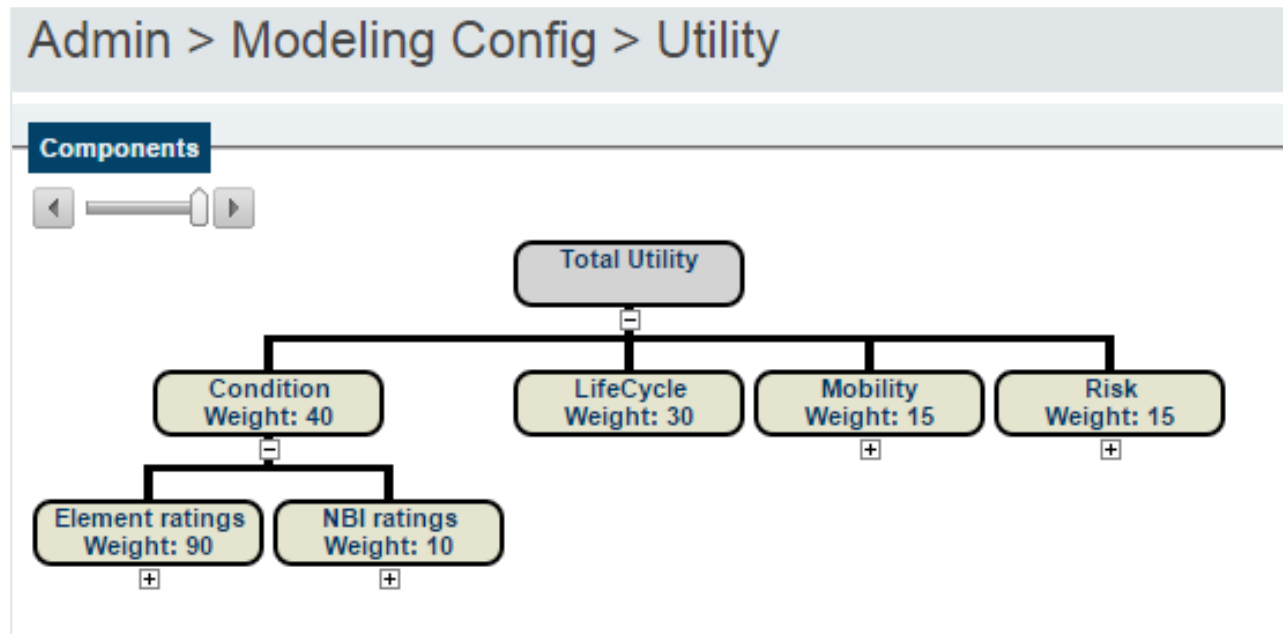
Risk - evaluates how bridge attributes and external factors affect the vulnerability of a bridge

LCC - evaluates the timing of when work occurs to provide the least cost over a given period of time.



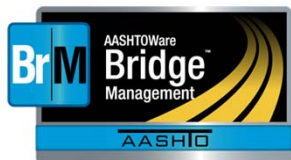
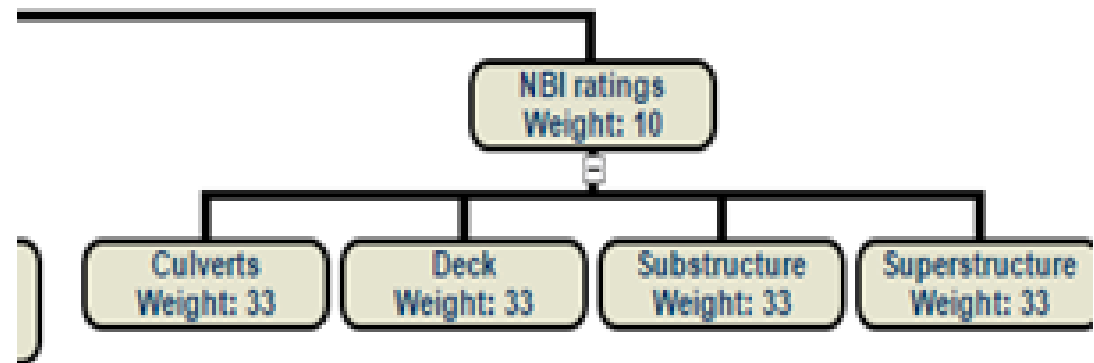
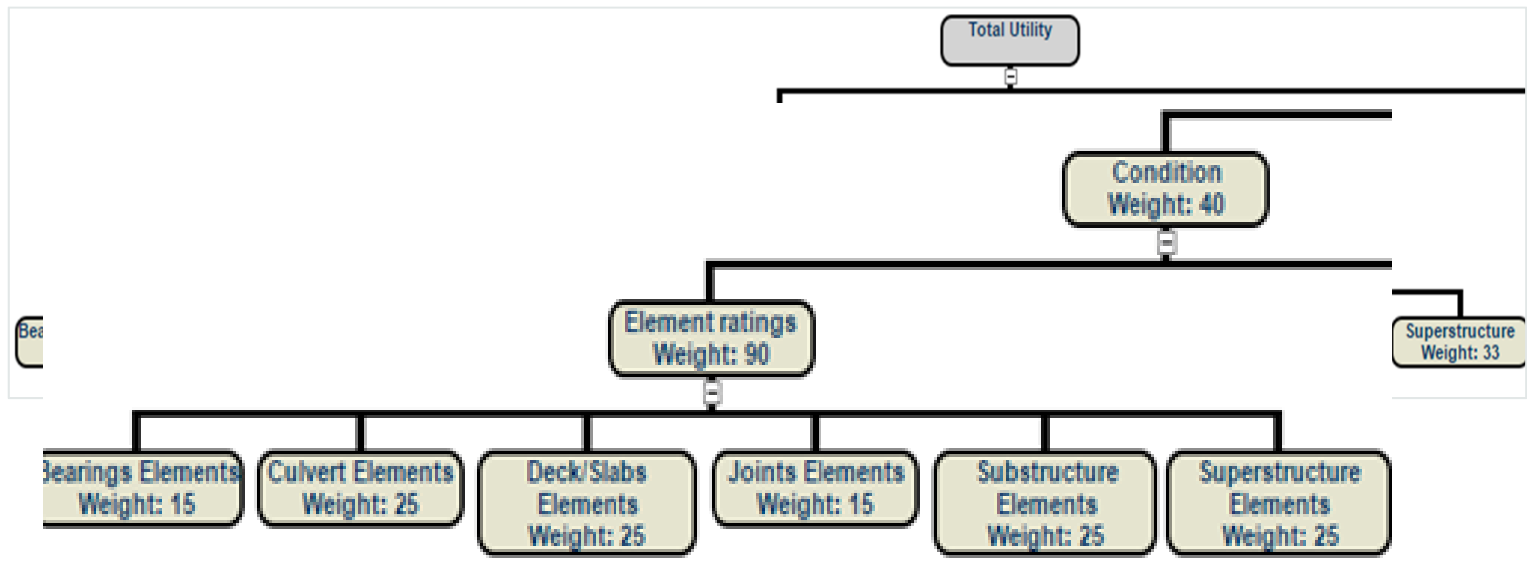
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Utility



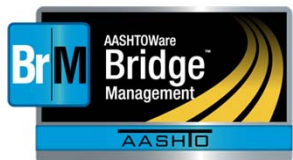
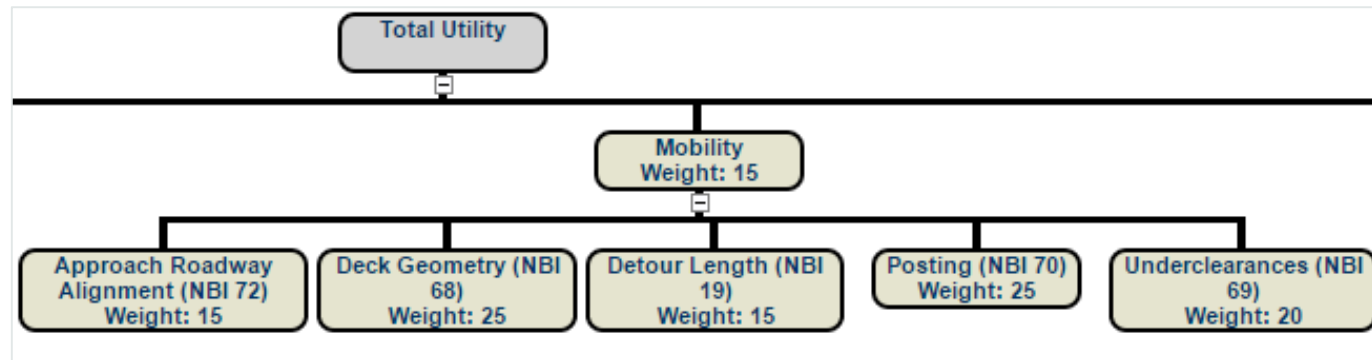
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Utility – Structural Condition



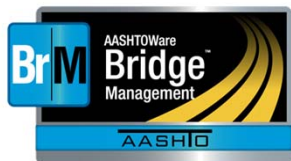
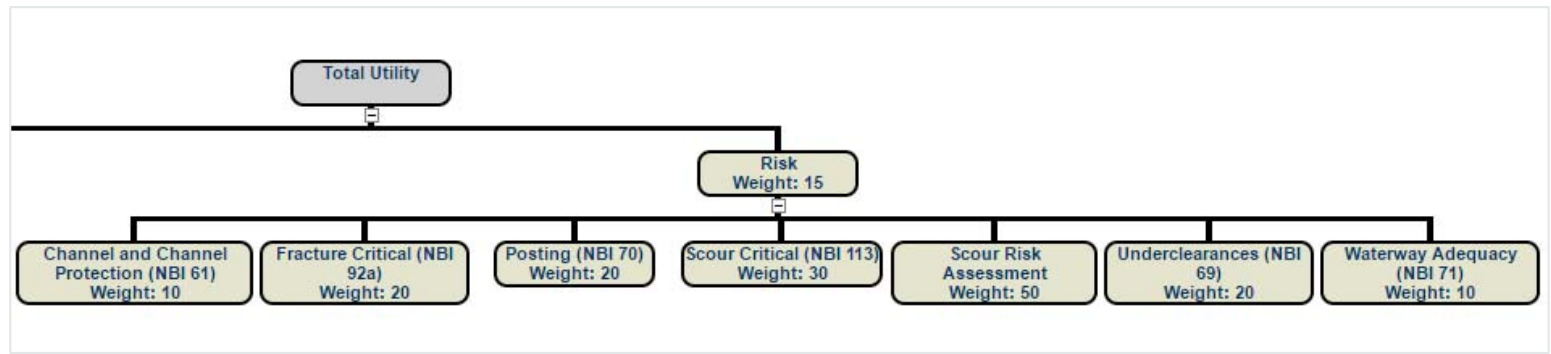
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Utility - Mobility



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Utility – Risk



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Utility – Scaling

Admin > Modeling Config > Utility

Deck

Criterion Properties

Name: Weight:

Type:

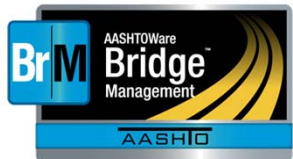
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Scaling

Formula:

Criterion	Scaled	Action
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<input type="text" value="8"/>	<input type="text" value="98"/>	Delete
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Criterion Rating Range
Min: Max:



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Objectives

Bridge	Utility	Condition	LCCA	Mobility	Risk
A	78	55	95	80	95
B	80	87	52	88	97
C	77	90	95	51	60
Relative Weights		35	25	20	20

- Bridge A requires preservation work per agency policies
- Bridge B would not require work per agency policies
- Bridge C requires preservation work per agency policies



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Objectives

Admin > Modeling Config > Weights Profile

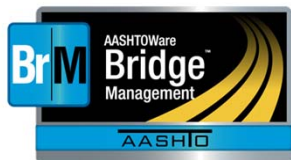
Profiles

Selected Weight Profile: Scour Weight Profile

Name: Scour Weight Profile

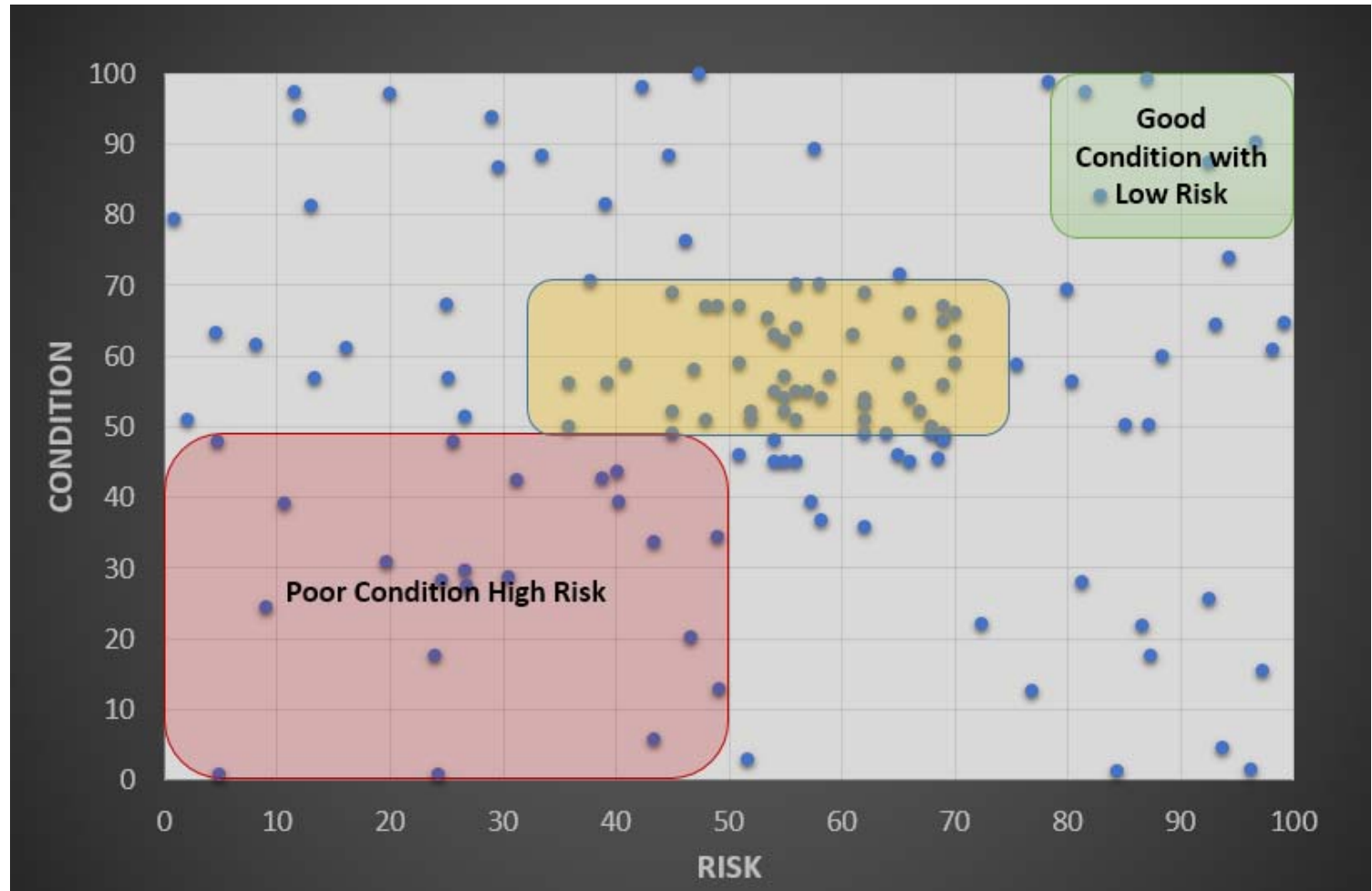
Utility Components

- [-] Total Utility
 - [+] Condition (40->0)
 - LifeCycle (30->0)
 - [+] Mobility (15->0)
 - [-] Risk (15->1)
 - Channel and Channel Protection (NBI 61) (10->0)
 - Fracture Critical (NBI 92a) (20->0)
 - Posting (NBI 70) (20->0)
 - Scour Critical (NBI 113) (30->50)
 - Scour Risk Assessment (50->50)
 - Underclearances (NBI 69) (20->0)
 - Waterway Adequacy (NBI 71) (10->0)



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